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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,099	01/21/2004	Charles Frank	022153.0012US1	7524
34284 7590 01/10/2007 ROBERT D. FISH RUTAN & TUCKER LLP 611 ANTON BLVD 14TH FLOOR COSTA MESA, CA 92626-1931			EXAMINER DILLON, SAMUEL A	
			ART UNIT 2185	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/10/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/763,099

Applicant(s)

FRANK ET AL.

Examiner

Sam Dillon

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/21/04 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/8/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. The instant application having Application No. 10/763,099 has a total of 16 claims pending in the application; there are 5 independent claims and 11 dependent claims, all of which are ready for examination by the examiner.

I. INFORMATION CONCERNING OATH/DECLARATION

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. ' 1.63.

II. STATUS OF CLAIM FOR PRIORITY IN THE APPLICATION

3. As required by M.P.E.P. ' 201.14(c), acknowledgment is made of applicant's claim for priority based on an application filed in January 1, 2003.

III. INFORMATION CONCERNING DRAWINGS

4. The applicant's drawings submitted January 21, 2004 are acceptable for examination purposes.

IV. ACKNOWLEDGEMENT OF INFORMATION DISCLOSURE STATEMENT

5. The information disclosure statement (IDS) submitted on March 8, 2004 is in compliance with the provisions of 37 CFR 1.97. As required by M.P.E.P. ' 609 (C), the applicant's submission of the submitted IDS is acknowledged by the examiner and the cited references have been considered in the examination of the claims now pending. As required by M.P.E.P. ' 609 C(2), a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

V. OBJECTIONS TO THE APPLICATION

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested:
Multicast communication protocol for a redundant array of storage areas.

VI. REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC : 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
8. **Claim 2, 9-10 and 16** and rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
9. **Claim 2** recites the limitation "*encapsulated packets which are split-ID packets comprising both an encapsulating packet and an encapsulated packet*". The claim language would seem to imply that the encapsulated packet enclosed within the encapsulated packet also encloses an encapsulated packet, as an encapsulated packet is defined by the claim as a split-ID packet with the above stated composition; however this interpretation would require an infinite number of packet encapsulations in a single encapsulated packet. As such, it is unclear what limitations the *encapsulated* encapsulated packet has compared to the encapsulated packet that encapsulates it.

For the purposes of further examination, the Examiner will interpret the claim as reading that the *encapsulated* encapsulated packet does not necessarily encapsulate any other encapsulated packets.

10. **Claim 2** recites the limitation "*each of any split-ID packets*". It is unclear whether this intends to read as "*each of (any split-ID packets that exist)*", i.e. every split-ID packet, or "*each of (any grouping of split-ID packets)*", i.e. a given subset of all split-ID packets. For the purposes of further examination, the Examiner will interpret the limitation as reading "*each split-ID packet*".

11. **Claim 9** recites the limitation "*the first device*". There is insufficient antecedent basis for this limitation in the claim. For the purposes of further examination, the Examiner will interpret the claim as reading "*a first device*".

12. **Claim 16** recites the limitation "*The system of Claim 55*". There is insufficient antecedent basis for this limitation in the claim. For the purposes of further examination, the Examiner will interpret the claim as reading "*The system of Claim 15*".

VII. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC ' 102 - Wang

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14. **Claims 1 and 3-11** are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (US Patent Number 6,834,326).

15. As per **Claim 1**, Wang disclose(s) a storage system comprising
a redundant array of multicast storage areas (column 2 lines 24-26).

16. As per **Claim 3**, **Wang** disclose(s) the storage system of **Claim 1**, wherein
the storage areas of the redundant array share a common multicast address
*inherently implied in column 2 lines 38-43, due the multicast packet being received by all
of them and multicast packets having a timeout threshold that limits their range).*
17. As per **Claim 4**, **Wang** disclose(s) the storage system of **Claim 1**, comprising
a plurality of RAID sets wherein each raid set comprises a plurality of storage
areas sharing a common multicast address (*inherently implied in column 2 lines 38-43*).
18. As per **Claim 5**, **Wang** disclose(s) a network comprising
a first device and a plurality of storage devices wherein the first device stores a
unit of data on each of the storage devices via a single multicast packet (*column 2 lines
40-43*).
19. As per **Claim 6**, **Wang** disclose(s)
a network of multicast devices which disaggregate at least one RAID function
across multiple multicast addressable storage areas (*column 2 lines 24-28*).
20. As per **Claim 7**, **Wang** disclose(s) the network of **Claim 6** wherein
the at least one RAID function is also disaggregated across multiple device
controllers (*each device inherently has a controller of some sort, column 2 lines 24-28*).
21. As per **Claim 8**, **Wang** disclose(s) a storage system comprising
a redundant array of multicast storage areas (*column 2 lines 24-26*) wherein the
system supports auto-annihilation of mooted read requests (*duplicate copies are
ignored, column 6 lines 50-54*).
22. As per **Claim 9**, **Wang** disclose(s) the system of **Claim 8** wherein
auto-annihilation comprises the first device responding to a read request
commanding other devices to disregard the same read request (*when a read request on*

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a mirrored system is received and responded to, in effect the responder tells the requestor to disregard the same read request in that the requestor will disregard all other response to the read request, column 6 lines 50-54).

23. As per Claim 10, Wang disclose(s) the system of Claim 9 wherein
auto-annihilation comprises a device that received a read request disregarding
the read request if a response to the read request from another device is detected
(column 6 lines 50-54).

24. As per Claim 11, Wang disclose(s)
a storage system comprising a dynamic mirror (column 4 lines 46-47).

Claim Rejections - 35 USC ' 103 – Wang and Kim

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all
obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

26. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (US Patent Number 6,834,326) and in view of Kim et al. (Internet Multicast Provisioning Issues for Hierarchical Architecture).

27. As per Claim 2, Wang disclose(s) the storage system of Claim 1, wherein the multicast devices are adapted to communicate across a network via packets (column 3 lines 24-33), but does not disclose the further limitations of Claim 2. Kim discloses

communicating across a network via encapsulated packets (Kim, section 2.3)
which are split-ID packets comprising both an encapsulating packet and an
encapsulated packet (Kim, section 2.3 paragraphs 1-2); and

each of any split-ID packets also includes an identifier that is split such that a portion of the identifier is obtained from the encapsulated packet while another portion is obtained from a header portion of the encapsulating packet (*section 2.3 paragraphs 1-2*).

Wang and Kim are analogous art in that they both deal with multicast network protocols. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to use Kim's IP-in-IP encapsulation procedure on Wang's storage network.

The motivation for doing so would have been that it supports security in the IP layer (Kim, section 3 paragraph 2) and that it solves some scalability issues and has easier implementation aspects (*Kim, section 5 paragraph 1*).

Therefore, it would have been obvious to combine Wang's storage system with Kim's IP-in-UP encapsulation procedure for the benefit of security, scalability and easier implementation, to obtain the invention of Claim 2.

Claim Rejections - 35 USC ' 103 – Wang and Kim

28. **Claims 12-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (*US patent Number 6,834,326*) and in view of Lin et al. ("*RMPT: A Reliable Multicast Transport Protocol*").

29. As per **Claim 12**, Wang disclose(s) the storage system of **Claim 11** wherein the dynamic mirror includes a mirrored storage area (*column 4 lines 46-47*), but for the purposes of this rejection does not disclose at least one corresponding map of incomplete writes.

Lin discloses a map of incomplete writes (*figure 5, page 1418*).

Wang and Lin are analogous art in that they both deal with multicast network protocols. At the time of the invention, it would have been obvious to modify Wang's multicast system to utilize Lin's RMTP protocol.

The motivation for doing so would have been that RMTP is a reliable protocol that avoids the acknowledgement implosion and propagation delays in wide area networks (*page 1415, left hand column, paragraph 3*).

Therefore, it would have been obvious to modify Wang's system to use the RMTP protocol as taught by Lin for the benefit of being reliable, avoiding acknowledgement implosion and delays, to obtain the invention of Claim 12.

30. As per Claim 13, Wang and Lin disclose(s) the storage system of Claim 11

wherein the dynamic mirror comprises N storage devices (*Wang, column 4 lines 46-47*) and M maps of incomplete writes where M is at least 1 and at most $2*N$ (*Lin, figure 5, page 1418*).

31. As per Claim 14, Wang and Lin disclose(s) the storage system of Claim 13 wherein

the map comprises a set of entries wherein each entry is either an LBA (*Lin, interpreted as per the specification as being a logical block address,*) or a hash of an LBA of a storage block of a storage area being mirrored.

32. As per Claim 15, Wang and Lin disclose(s) the system of Claim 13 comprising

at least one process monitoring storage area ACKs (*interpreted as per the specification as being an acknowledgement signal or packet of some sort*) sent in response to write commands, the process updating any map associated with a particular area whenever a write command applicable to the area is issued (*Lin, page 1418 left-hand column paragraphs 3-4*),

the process also sending an ACK on behalf of any storage area for which the process did not detect an ACK (*Lin, inherently implied in that if the sender does not receive an ACK it assumes it received an ACK, section 3.3 paragraph 3*).

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33. As per Claim 16, Wang and Lin disclose(s) the system of Claim 55 (*interpreted as Claim 15*) wherein

updating a map comprises setting a flag whenever an ACK is not received (*Lin, section 3.3 paragraph 3 states that the sender assume, in the absence of an ACK there is no problem, and page 1418 left-hand column paragraph 3 states that swin_lb and avail_win are increased*) and clearing a flag whenever an ACK is received (*Lin, when data is sent, send_next is increased, which can be construed as clearing by writing a new value to, page 1418 left-hand column paragraph 3*).

VIII. RELEVANT ART CITED BY THE EXAMINER

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Quinn et al. ("*IP Multicast Applications: Challenges and Solutions*") disclose an introductory guide to designing and implementing multicast applications as they differ from unicast applications:

Thompson (*US Patent Number 6,895,461*) discloses a storage over IP device.

IX. CLOSING COMMENTS

a. STATUS OF CLAIMS IN THE APPLICATION

35. The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. '707.07(i):

a(1). CLAIMS REJECTED IN THE APPLICATION

36. Per the instant office action, Claims 1-16 have received a first action on the merits and are subject of a first action non-final.

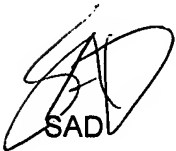
b. DIRECTION OF FUTURE CORRESPONDENCES

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Dillon whose telephone number is 571- 272-8010. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on 571-272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

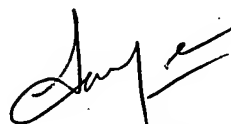
IMPORTANT NOTE

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



SAD

Sam Dillon
Examiner
Art Unit 2185



SANJIV SHAH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100